DOCUMENT RESUME

ED 165 103 CS 004 586

AUTHOR Garner, Ruth
TITLE Verbalization of Schemata Over Time: Investigation of Changes for Fifth Graders and Adults.
PUB DATE 78
NOTE 12p.; Paper presented at the Annual Meeting of the National Reading Conference (28th, St. Petersburg Beach, Florida, November 30-December 2, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Cognitive Processes; Elementary Education; Higher Education; *Reading Processes; *Reading Research; *Verbal Communication
IDENTIFIERS *Schemata

ABSTRACT

Studies of 42 fifth-grade students and 36 college undergraduates were conducted to test changes in verbalizations of schemata over time and in response to informational jolts. In both experiments, subjects were asked to write everything they could think of about dinosaurs and then to put those ideas in order of importance. Two weeks later, the subjects were divided into three groups: one was asked to repeat the earlier task; the second was asked to provide information in response to the traditionally taught statement, "Dinosaurs are cold-blooded ancestors of today's reptiles"; and the third group was asked to respond to the recently proposed statement, "Dinosaurs are the warm-blooded ancestors of today's birds" (the informational jolt). Subjects were asked to put their ideas in order of importance and then were asked to indicate the statement with which they were more comfortable. It was found that language users responded to informational jolts and altered verbalized schemata. Verbalized schemata changes occurred over time and changed differentially according to the presence or absence of an informational jolt. (TJ)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED165103

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Ruth Garner
University of Maryland
College of Education
Department of Early Childhood-
Elementary Education
College Park, Maryland 20742

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Ruth Garner

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Verbalization of Schemata Over Time: Investigation of Changes for Fifth Graders and Adults

Ruth Garner

University of Maryland

The evidence of the power of schemata in language comprehension processes is persuasive. We know. for instance, that schemata of language users are probably a principal determiner of what a reader can learn from text (Anderson, Spiro, & Anderson, 1977). We know, furthermore, that text information that does not appear to fit into slots of relevant schemata may be perceived by a language user as insignificant (Anderson, 1977a; Anderson & Pichert, 1978: Pichert & Anderson, 1977.). Finally, we have evidence that schemata are often imposed on text, even when it can be

CS004 586

demonstrated that some violence is done to the text information (Anderson, Reynolds, Schallert, & Goetz, 1977). Given demonstration of the powerful effect of schemata on language comprehension processes, generating theoretically acceptable and empirically manageable characterizations of these abstract knowledge structures seems an important enterprise for reading researchers.

Part of that enterprise is the study of schemata change. Two rather different sorts of change were investigated in these two studies with fifth graders and adults. One sort is discussed by Chafe (1977). He is interested in what he labels "verbalization"--"all those processes by which nonverbal knowledge is turned into language" (p. 41). He suggests that these verbalizations are "creative," that speakers structure elements of events they describe quite differently across time.

A different sort of schemata change is discussed by Anderson (1977b). He states that, given schema-text informational inconsistency, language users are likely to resort to counterargument within a current framework, to treatment of anomalies as exceptions, or to separation of incompatible information. He points out that the last thing a person does is make a fundamental change in schemata.

Do verbalizations of schemata change dramatically over time? Do language users respond to informational jolts and alter verbalized schemata? Those research questions prompted two studies--the first with fifth graders and the second with college undergraduates.

Method

Subjects

Forty-two fifth graders from a Cheverly, Maryland K-8 school participated in the first study. Cheverly is a middle-class suburb of Washington, D.C. Thirty-six college students from an undergraduate reading methods course at the University of Maryland participated in the second study as partial fulfillment of a course requirement.

Materials

Chafe's work with verbalized knowledge had focused on events; the decision was made to look in these studies at object schemata. For two reasons, the topic of "dinosaurs" was selected. One reason was the fact that subject experience with dinosaurs--in the flesh or in print--over the period of the studies was highly unlikely. Had a topic such as "basketball" or "guinea pigs" or "spaghetti" been used, differential experience during the experiments would have been a distinct possibility. Research questions of interest were time-related verbalization changes and informational jolt-related verbalization changes; new experiences (and potentially new knowledge) would confound results.

A second reason for selecting the "dinosaurs" topic was the appearance a bit ago of a Scientific American article (Bakker, 1975) on dinosaur evolution. The major thesis of the piece was that dinosaurs were not in fact reptiles, but were

warm-blooded ancestors of today's birds. This notion is inconsistent with the much-taught view (stated explicitly in 10 of 10 elementary science texts surveyed by the investigator) that dinosaurs were cold-blooded ancestors of today's reptiles. It seemed that the Bakker view might serve as an informational jolt for the studies.

Procedure

In both studies, subjects were seen in two sittings. In both sittings they responded to written material packets, working in large-group situations. They were not permitted to discuss the tasks with fellow students or with the investigator.

Sitting one. Though fifth graders in the first study and undergraduates in the second study were randomly assigned to treatment groups for investigation of differential informational jolt effects, the task in sitting one was uniform for all treatment groups. Subjects first received a sheet of paper with 15 lines and with the following directive at the top:

> Think about dinosuars. Provide as much information as you can about dinosaurs.

When subjects indicated that they were finished with this step, they were given index card packets and a second sheet of paper with the following directives:

> Now you are going to work with index cards. The piece you have just written about dinosaurs will guide your work on this past of the task.

> On the one yellow card write the most important idea about dinosaurs. On the two blue cards write the next most important ideas. On the three white cards write the less important ideas about dinosaurs. Though the piece you have written will guide you, you may add or delete bits of information.
>
> You may request as many white cards as you wish. On any unused cards, write "No Response."

Sitting two. Two weeks later in each study, subjects were given a sheet of paper with directives varying according to treatment. One-third of the fifth-grade group and one-third of the undergraduate group were directed as follows:

> Think about dinosaurs. Provide as much information as you can about dinosaurs.

A second third of each group received the following directive:

> Think about dinosaurs. Provide as much information as you can in response to the following statement: Dinosaurs are cold-blooded ancestors of today's reptiles.

A final third of each group received this guidance:

> Think about dinosaurs. Provide as much information as you can in response to the following statement: Dinosaurs are warm-blooded ancestors of today's birds.

When subjects indicated that they were finished with this step, they were given index card packets and a second sheet of paper with exactly the same directives they had been

given in sitting one.

A final task was presented to all subjects in sitting two. This task was included to assess the "jolt value" of the "warm-blooded" statement. The survey of elementary science texts had provided preliminary confirmation that this was indeed new information. It was possible, however, that fifth graders or undergraduates already accepted the Bakker view on the "warm-blooded"-"cold-blooded" issue. If this were the case, the "jolt value" of the "warm-blooded" information would be minimal. Therefore, on a third sheet, all subjects were directed in the following manner:

> Think one last time about dinosaurs. In terms of all the information you have about dinosaurs, X the statement with which you are more comfortable. You may X both.
>
> Dinosaurs are cold-blooded ancestors of today's reptiles. _____
>
> Dinosaurs are warm-blooded ancestors of today's birds. _____

In terms of this "comfortableness" measure, among the 42 fifth graders, 38 subjects Xed the "cold-blooded" statement, and four Xed the alternative. In similar fashion, among the 36 undergraduates, 35 subjects Xed the "cold-blooded" statement, and one Xed the alternative. In both studies, it seemed justifiable to

presume that the "warm-blooded" information had in fact provided "jolt value" for the purposes of the study.

Results

To analyze changes in verbalized schemata, the investigator and a research assistant studied the two index card packets provided by fifth graders and undergraduates in the two sittings. Working independently, they scored each instance of information comparable in gist and on the same color card as a "one." Clearly, if substantial changes in verbalized schemata were the pattern in the studies, scores would be low, close to zero. On the other hand, if great stability in verbalizations were the pattern, scores would approximate six, the total number of cards used by subjects. Agreement on scoring between judges was .94 for fifth-grade information, .92 for undergraduate information.

The mean scores for matched bits of information across all treatment groups were calculated to answer the schemata change-across-time question. The mean scores (1.142 for fifth-grade subjects, 1.278 for undergraduate subjects) were quite low. The low scores suggest that structured verbalizations of schemata do change over time.

Next, an analysis of variance among scores for the three (neutral, "cold-blooded," or "warm-blooded" directive) treatment groups in the studies was performed to answer the informational jolt response questions. If the "warm-blooded" statement presumed

to have "jolt value" in fact affected verbalized schemata very little, one would anticipate that all three groups in both studies would reflect schemata change over time about equally, with no clear differences arising from treatment. Within both experiments, that was not the case. The differences among mean scores for neutral-directive fifth graders (2.143), for "cold-blooded"-directive fifth graders (.786), and for "warm-blooded"-directive fifth graders (.500) were analyzed by a one-way analysis of variance. There were significant differences among treatment groups, F (2, 39)=21.486, $p < .001$. Similarly, the differences among mean scores for neutral-directive undergraduates (2.75), for "cold-blooded"-directive undergraduates (.917), and for "warm-blooded"-directive undergraduates (.167) were analyzed, and there were again significant differences among treatment groups, F (2, 33)-15.595, $p < .001$. The significant differences suggest that language users do respond to informational jolts and alter verbalized schemata.

Discussion

Within the two studies, there was evidence of two sorts of verbalized schemata changes. Structures verbalizations changed over time, and verbalizations changed differentially according to the presence or absence of an informational jolt.

The change-across-time finding supports the Chafe (1977) position. Subjects' providing and structuring different bits of information about dinosaurs in the two sittings lend support

to the notion of "creative" verbalization. Chafe had discussed the phenomenon for event schemata; these studies provide some evidence that the phenomenon holds for at least one object schema (dinosaurs) as well.

The informational jolt response finding might be a source of optimism to schema theorists who have shared evidence of imposed intact schemata, unaffected by incoming jarring information from external sources (e.g., from text). The next step in this schemata change research program is investigation of responses by readers to chunks of text that require response and accomodation. One key variable for investigation might be degree of emotional investment. It might well be that resistance to change is the norm for emotional investment schemata (e.g., matters related to politics, ethics), whereas some capacity to change is the pattern for more impersonal schemata (e.g. dinosaur evolution).

References

Anderson, R. C. Schema-directed processes in language comprehension. Technical report from the Center for the Study of Reading. University of Illinois at Urbana-Champaign, 1977, No. 50. (a)

Anderson, R.C. The notion of schemata and the educational enterprise: General discussion of the conference. In R.C. Anderson, R.J. Spiro, & W.E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale: Lawrence Erlbaum Associates, 1977. (b)

Anderson, R.C., & Pichert, J.W. Recall of previously unrecallable information following a shift in perspective. Journal of Verbal Learning and Verbal Behavior, 1978, 17, 1-12.

Anderson, R.C., Reynolds, R.E., Schallert, D.L., & Goetz, E.T. Frameworks for comprehending discourse. American Educational Research Journal, 1977, 14, 367-381.

Anderson, R.C., Spiro, R.J., and Anderson, M.C. Schemata as scaffolding for the representation of information in connected discourse. Technical report from the Center for the Study of Reading, University of Illinois at Urbana-Champaign, 1977, No. 24.

Bakker, R.T. Dinosaur renaissance. Scientific American, 1975, 232, 58-78.

Chafe, W.L. Creativity in verbalization and its implications for the nature of stored knowledge. In R.O. Freedle (Ed.), Discourse production and comprehension. Norwood: Ablex Publishing Company, 1977.

Pichert, J.W., & Anderson, R.C. Taking different perspectives on a story. Journal of Educational Psychology, 1977, 69, 309-315.

Abstract

Fifth graders and college undergraduates verbalized information about dinosaurs in the first sitting of two studies. In a second sitting in the studies, verbalization was manipulated; some subjects received an "informational jolt." Within the studies there was evidence of two sorts of changes in verbalized schemata. Firstly, across treatments, subjects provided and structured different bits of information about dinosaurs in the two sittings. Secondly, subjects needing to respond to external "jolt value" information changed verbalized schemata about dinosaurs more than subjects directed to simply tap stored knowledge in both sittings.